PATENT ABSTRACTS OF JAPAN

(11)Publication number : **2001-171095**
(43)Date of publication of application : **26.06.2001**

(51)Int.Cl. **B41J 2/01**
B41M 5/00

(21)Application number : **11-359357**
(22)Date of filing : **17.12.1999**

(71)Applicant : **SHARP CORP**
(72)Inventor : **NAKAYA HIROAKI**
KAMOTO TAKANORI
FUJII ICHIRO
FUKUYAMA KEIICHI
TAKATO KIYOSHI
NAKAMURA MASA

(54) INK JET PRINT RECORDING METHOD AND TRANSLUCENT WHITE INK COMPOSITION FOR USE THEREIN

(57)Abstract:
PROBLEM TO BE SOLVED: To provide an ink jet print recording method and a translucent white ink composition for use therein in which the problems of blur or offset of image and non-glossiness can be solved sufficiently at the time of recording on an uncoated sheet, e.g. a plain paper or a post card, with a water soluble dye ink.
SOLUTION: In the ink jet print recording method for recording an image on a recording material with an water soluble dye ink, a translucent white ink composition principally comprising an inorganic oxide pigment is bonded previously to a position on a material for recording an image of the water soluble dye ink.

CLAIMS

[Claim(s)]
[Claim 1]It is a record method by ink jet printing which records a picture in water-soluble-dye ink on a recorded material, a translucent white ink constituent which uses inorganic oxide paints as the main ingredients to a part on a recorded material which records a picture of water-soluble-dye ink -- beforehand -- adherence **** -- a record method by ink jet printing characterized by things.
[Claim 2]A record method by the ink jet printing according to claim 1 which is a constituent containing a vehicle with which a translucent white ink constituent consists of a high molecular compound and a water soluble organic solvent, and water as inorganic oxide paints, a dispersing agent, and/or a binder.
[Claim 3]A record method by the ink jet printing according to claim 1 or 2 whose inorganic oxide paints are silica paints, alumina paints, or those mixtures.
[Claim 4]A record method by ink jet printing of any one statement of claim 1-3 whose recorded material is non-coated paper.
[Claim 5]A translucent white ink constituent containing a vehicle which is used with a

record method by the ink jet printing according to claim 1, and consists of a high molecular compound and a water soluble organic solvent, and water as inorganic oxide paints, a dispersing agent, and/or a binder.

[Translation done.]

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention]This invention relates to the translucent white ink constituent used by record method suitable for record by the ink jet printing which uses non-coated paper, such as a regular paper and a postcard, as a recorded material, and a method for the same.
[0002]
[Description of the Prior Art]The recording method by ink jet printing has the advantage that there are few noise generations at the time of record so that the high-speed printing of the picture of high resolution is possible. And when the production art of the ink head of having an orifice of a high integration high definition progressed and the regurgitation of the minute ink droplet became possible, these days, as for the record by ink jet printing, image printing of the above high resolution is realized by 1200dpi.
[0003]In the recording method by ink jet printing, various water soluble dye is dissolved in the solvent which consists of water or water, and a water soluble organic solvent, and the water-soluble-dye ink which added various additive agents if needed is mainly used. On the occasion of the regurgitation from a head orifice, the water-soluble-dye ink using such water soluble dye could not cause blinding easily, and the regurgitation is stable.
It has the advantage of being hard to cause aging, such as phase separation and settlings formation.

[0004]However, generally the recorded image of water-soluble-dye ink may be inferior to lightfastness or a water resisting property, and has the fault of being easy to produce variation in print quality according to the kind of recorded material. When using and recording water-soluble-dye ink on non-coated paper, such as a regular paper and a postcard, especially, in addition to the aforementioned fault, a blot, color bleeding, back projection (strike-through), non-glossiness of a picture, etc. may become a problem.
[0005]In order to solve such a problem, improvement of a recorded material or an ink presentation, improvement of a record method, development of color aqueous pigment ink, etc. are furthered. For example, after printing the ink composition containing reactive dye on a medium (recorded material), the ink jet print method which improves the robustness (dirt tolerance) of a picture and a water resisting property is indicated by JP,3-153385,A by processing a medium with pH ten or more basic solutions.
[0006]After applying a polyvalent-metallic-salt solution to a substrate (recorded material), the preparation method of the printing picture which improves a water resisting property and color bleeding is indicated by JP,5-202328,A by applying the ink composition containing the chemical dye material which has a carboxy group.

[0007]By using together the color ink containing a salt, and the black ink thickened or condensed by operation of the aforementioned salt and a salt, to JP,6-106735,A, image concentration is high, and the drip injection record method which acquires a high-definition picture without bleeding is indicated.
[0008]In JP,8-209049,A, the ink containing a gel morphogenetic substance and the ink containing a gelling initiator are ejected from two or more ink pens, and the print method which reduces color bleeding is indicated by forming gel on a print medium (recorded material).
[0009]By making the ink composition which contains in JP,9-207424,A the reaction mixture containing polyvalent metallic salt, and paints and a resin emulsion adhere to a recording medium (recorded material), color bleeding is prevented and the ink jet recording method which realizes high-concentration printing is indicated.
[0010]However, in the above-mentioned advanced technology, problems produced when using and recording water-soluble-dye ink on non-coated paper, such as a regular paper and a postcard, such as a blot of a picture, back projection, non-glossiness, were not fully able to be solved.
[0011]Namely, by the method of a statement, to above-mentioned JP,3-153385,A, JP,5-202328,A, JP,6-106735,A, and JP,8-209049,A. Although the fall of color bleeding is accepted, problems, such as a blot, back projection, etc. by osmosis of a color material to the grain direction of a recorded material, cannot fully be solved. pH ten or more basic solutions used for record not only improve the corrosiveness of a device, but in the method of a statement, JP,3-153385,A has a problem that it is dangerous also on a human body.
[0012]Although a method given in JP,9-207424,A is the method of recording a picture using pigment ink, problems, such as the preservation stability of color pigment ink, the stability of the regurgitation, and blinding, are not fully solved. The art which can solve the problem of non-glossiness of a picture produced when a color picture is recorded on a recorded material like a regular paper is not found out at present.
[0013]
[Problem(s) to be Solved by the Invention]. Produce this invention, when using for and recording water-soluble-dye ink on non-coated paper, such as a regular paper and a postcard. Let it be a technical problem to provide the translucent white ink constituent used by record method by the ink jet printing which can fully solve problems, such as a blot of a picture, back projection, non-glossiness, and a method for the same.
[0014]
[Means for Solving the Problem]As a result of this invention persons' inquiring wholeheartedly that the above-mentioned technical problem should be solved, before recording a picture in water-soluble-dye ink on a recorded material, a translucent white ink constituent which uses inorganic oxide paints as the main ingredients beforehand to a part on a recorded material which records a picture of water-soluble-dye ink -- adherence **** -- by things, it found out that problems, such as a blot of a picture, back projection, non-glossiness, were fully solvable, and resulted in this invention.
[0015]According to this invention, it is a record method by ink jet printing which records a picture in water-soluble-dye ink on a recorded material in this way, a translucent white ink constituent which uses inorganic oxide paints as the main ingredients to a part on a recorded material which records a picture of water-soluble-dye ink -- beforehand -- adherence **** -- a record method by ink jet printing

characterized by things is provided.
[0016]According to this invention, it is used with a record method by the above-mentioned ink jet printing, and a translucent white ink constituent containing a vehicle which consists of a high molecular compound and a water soluble organic solvent, and water as inorganic oxide paints, a dispersing agent, and/or a binder is provided.
[0017]
[Embodiment of the Invention]The translucent white ink constituent (an "ink composition" is called hereafter) of this invention uses inorganic oxide paints as the main ingredients, and contains the vehicle which consists of the high molecular compound and the water, and the water soluble organic solvent as a dispersing agent and/or a binder.
[0018]The inorganic oxide paints used for this invention can make an ink composition white translucent, and the inorganic oxide paints which should just usually be used in this field can be used for them. As such inorganic oxide paints, silica paints, alumina paints, or those mixtures are used suitably, for example.
[0019]As for inorganic oxide paints, it is preferred that it is a particle with a particle diameter of 200 nm or less. If the particle diameter of the particles as inorganic oxide paints is 200 nm or less, since the transparency of an ink composition becomes high, it becomes difficult for the dot concentration of the picture of the water-soluble-dye ink recorded later to fall and a clear picture is acquired, it is desirable.
[0020]As inorganic oxide paints, can also use commercial inorganic oxide paints sol as it is, and as such inorganic oxide paints sol, silica and the silica which distributed the particles of alumina to water and/or a water soluble organic solvent -- sol and alumina sol being mentioned and specifically, The organosilica sol by NIPPON SHOKUBAI Co., Ltd. (trade name), the snow textile by Nissan Chemical Industries, Ltd. (trade name), organosilica sol (trade name), and alumina sol (trade name) are mentioned. The above inorganic oxide paints may be further added to the inorganic oxide paints sol of such marketing.
[0021]A high molecular compound is mentioned as [both] a binder for sticking inorganic oxide paints on the dispersing agent for distributing inorganic oxide paints uniformly in an ink composition, and a recorded material.
[0022]As a high molecular compound used as a dispersing agent and/or a binder, For example, starch, gelatin, latex, casein, gum arabic, Water soluble polymer compounds, such as sodium alginate and polyacrylamide, Cellulosics, such as methyl cellulose, carboxymethyl cellulose, and hydroxymethylcellulose, Polyacrylate, the salt of a styrene acrylic acid copolymer, the salt of a vinylnaphthalene-acrylic acid copolymer, The salt of a styrene maleic acid copolymer, the sodium salt of beta-naphthalene sulfonic acid formalin condensation product, Nonionic high molecular compounds, such as negative ion nature high molecular compounds, such as a salt of a vinylnaphthalene-maleic acid copolymer and an phosphate, and polyvinyl alcohol, a polyvinyl pyrrolidone, and a polyethylene glycol, etc. are mentioned.
[0023]These high molecular compounds can use two or more sorts together, and latex, casein, methyl cellulose, carboxycellulose, polyvinyl alcohol, and a polyvinyl pyrrolidone are preferred also in the above-mentioned high molecular compound.
[0024]Although a variety of solvents can be used as a vehicle, the mixed solvent which consists of a water soluble organic solvent and water is preferred. As a water soluble organic solvent, for example Methyl alcohol, ethyl alcohol, Alkanol, such as n-propyl alcohol, isopropyl alcohol, n-butyl alcohol, and sec-butyl alcohol. Amide, such as dimethylformamide and dimethylacetamide. Ketone or keto alcohol (ketol),

such as acetone and diacetone alcohol, Polyalkylene glycols, such as ether, such as a tetrahydrofuran and dioxane, a polyethylene glycol, and a polypropylene glycol. Alkylene glycols, such as ethylene glycol, a diethylene glycol, propylene glycol, and triethylene glycol, Glycerin, ethylene glycol monomethyl ether, ethylene glycol monoethyl ether, The low-grade alkyl ether of polyhydric alcohol, such as diethylene glycol monomethyl ether and diethylene glycol monoethyl ether. The JI low-grade alkyl ether of polyhydric alcohol, such as triethylene glycol wood ether and triethylene glycol diethylether. Diol, such as 1,3-propanediol and 1,4-butanediol, sulfolane, N-methyl-2-pyrrolidone, 1,3-dimethyl-2-imidazolidinone, etc. are mentioned.

[0025]These water soluble organic solvents can use two or more sorts together, and isopropyl alcohol, a polyethylene glycol, a diethylene glycol, glycerin, 1,3-propanediol, and N-methyl-2-pyrrolidone are preferred also in the above-mentioned water soluble organic solvent.

[0026]To ink full weight, zero to 25% of the weight, a water soluble organic solvent is 5 to 15 % of the weight, and water is 80 to 95 % of the weight preferably 60 to 95% of the weight.

[0027]As for the blending ratio of inorganic oxide paints to the full weight of an ink composition, 1 to 30 % of the weight is preferred, and its 6 to 18 % of the weight is more preferred. If the blending ratio of inorganic oxide paints is 1 to 30% of the weight of within the limits, it will become difficult to produce a blot and a strike-through in the picture of the water-soluble-dye ink recorded later.

[0028]The blending ratio of the high molecular compound as the dispersing agent and/or binder to full weight of an ink composition is 15 to 25 % of the weight preferably 0.5 to 30% of the weight. moreover -- the compounding ratio of the inorganic oxide paints in an ink composition and a high molecular compound receives inorganic oxide paints 100 weight section -- a high molecular compound -- ten to 125 weight section, it is 75 to 100 weight section preferably, and when using especially silica paints, 75 to 100 weight section is preferred. When the mean particle diameter of the inorganic oxide paints to be used is large, few directions of the loadings of a high molecular compound are preferred.

[0029]The ink composition of this invention mixes the vehicle which consists of the high molecular compound and the water soluble organic solvent, and water as above-mentioned inorganic oxide paints, dispersing agent, and/or binder, and is prepared by distributing or dissolving inorganic oxide paints into a vehicle.

[0030]Although the ink composition prepared as mentioned above is based also on the kind of the inorganic oxide paints to be used or water soluble organic solvent, in order to make inorganic oxide paints exist stably in a solvent and to avoid the adverse effect to a device or a human body, it is preferred to prepare pH to 4-10 with publicly known buffer solution (pH adjuster).

[0031]The ink composition of this invention may contain the publicly known additive agent used in this field by request, unless the effect of this invention is checked. The addition of a penetrating agent which a penetrating agent, a surface-active agent, a viscosity controlling agent, a surface tension regulator, an antifungal agent, a germicide, a fluorescent brightener, etc. are mentioned [addition], and promotes osmosis of the ink composition to a recorded material as such an additive agent is effective.

[0032]As a penetrating agent, butylcarbitol, butyl cellosolve, a pentanol, butanol, ethylene glycol alkyl acetate, and ethylene glycol alkyl ether are mentioned, for example. These penetrating agents can use two or more sorts together, and

butylcarbitol, butyl cellosolve, a pentanol, and especially ethylene glycol alkyl acetate are preferred also in the above-mentioned penetrating agent. The blending ratio of a penetrating agent to the full weight of an ink composition is about 1 to 5 % of the weight preferably about 0 to 12% of the weight.

[0033]The ink composition of this invention is quick-drying capability, and forms the gel layer of inorganic oxide paints immediately after the regurgitation on a recorded material. The silica paints and alumina paints which are inorganic oxide paints have high coloring matter absorptivity, and since it has porous structure, water-soluble-dye ink is absorbed by the gap of inorganic oxide paints. Since the coloring matter in water-soluble-dye ink is caught by the inorganic oxide paints in the outermost layer of a gel layer at this time, the coloration nature of a picture becomes good and it becomes difficult to produce a blot and a strike-through.

[0034]The water resisting property and the robustness of a picture, and the glossiness which are recorded in water-soluble-dye ink can be arbitrarily changed by choosing suitably the kind of the high molecular compound and additive agent which constitute an ink composition.

[0035]The water-soluble-dye ink (a yellow ink composition, a magenta ink composition, and a cyan ink composition) used for this invention consists of an additive agent added a color, a vehicle, and if needed, and the publicly known thing used in this field is usually used as it is. Although it may be insoluble coloring matter like paints or a disperse dye as a color, water soluble dye, such as a direct color, acid dye, a basic stain, reactive dye, and a food dye, is preferred.

[0036]Although a variety of solvents can be used as a vehicle, the mixed solvent which consists of a water soluble organic solvent and water is preferred, and what was illustrated as a water soluble organic solvent of the aforementioned ink composition is mentioned as a water soluble organic solvent. The blending ratio of a color to water-soluble-dye ink is about 3 to 18 % of the weight preferably about 0.1 to 50% of the weight, and the blending ratio of a water soluble organic solvent is about 0.1 to 50 % of the weight.

[0037]The record method by the ink jet printing of this invention consists of recording a picture in water-soluble-dye ink on the ink composition which stuck the ink composition to the part on the recorded material which records the picture of water-soluble-dye ink, and subsequently adhered to it.

[0038]Especially as a recorded material, although not limited, in the point of fully demonstrating the effect of this invention, non-coated paper, such as a regular paper and a postcard, is illustrated.

[0039]It is room temperature conditions or what is necessary is to breathe out an ink composition on a recorded material by the recording method by publicly known ink jet printing for example, and just to dry using a publicly known heating method, in order to stick an ink composition on a recorded material. Also when recording a picture in water-soluble-dye ink, the recording method by ink jet printing is used. Therefore, adherence of an ink composition can be performed using the recorder of publicly known ink jet printing like record of the picture in water-soluble-dye ink.

[0040]As long as it is a method which makes it secede from ink more effectively than a nozzle, and can give ink to the recorded material which is a range object as a recording method by ink jet printing, it may also be what kind of method. For example, the piezo-electric element method which applies a pressure to ink and makes ink inject from a nozzle by giving an electrical signal to a piezo-electric element and producing mechanical displacement, The inkjet method which makes ink produce a rapid volume change and makes ink breathe out from a nozzle, an electrostatic suction

method, etc. are held by heating ink.
[0041]Drawing 1 is a schematic diagram on top showing the composition of the recorder of the ink jet printing of a piezo-electric element method. 1 is the recording head which the ink tank and the recording head unified, and this recording head 1 moves in the arrow AB direction along the carriage 3 by the timing belt 4 driven by the motor 5. 2 is a recorded material and is sent in the direction of arrow C by the paper feed 6. 7 is the recording board, when the recorded material 2 passes the recording board 7, ink is breathed out from the nozzle arranged at the lower part of the recording head 1, and ink is given on the recorded material 2. In order to promote desiccation of the ink breathed out on the recorded material 2, the heating apparatus (not shown) which warms the recording board 7 in contact with the recorded material 2 at about 30-70 ** may be attached. The recorded material 2 which record ended is conveyed even to the paper receptacle 8 by the paper feed 6.
[0042]As the recording head 1, the on-demand type ink jet recording head (the regurgitation orifice diameter of 80 micrometers, the piezo vibrator driver voltage 60V, frequency of 4 kHz) which carries out the regurgitation of the ink by a piezo vibrator is mentioned, for example.
[0043]The recording head 1 allots the nozzle which makes an ink tank the upper part and to which it carries out the regurgitation of the ink to the lower part. drawing 2 is an outline enlarged drawing of a nozzle face -- the nozzle face 9 of an ink composition, and color water-soluble-dye ink (a yellow ink composition.) It consists of the nozzle faces 10, 11, and 12 of a magenta ink composition and a cyan ink composition, and each constituent is breathed out from the nozzle hole 13 arranged in each nozzle face. Here, the arrow C corresponds to the paper feed direction in drawing 1. Although each of above-mentioned nozzle faces 9-12 should just be arranged to compensate for paper feed so that adherence of an ink composition and record of the picture in color water-soluble-dye ink can be performed continuously, and not limited to arrangement of the nozzle face of drawing 2, the thing of drawing 2 is common.
[0044]In recording a picture with the record method of the ink jet printing of this invention, For example, an ink composition is breathed out from the nozzle face 9 of the recording head 1 to the recorded material 2 on the recording board 7, The recorded material 2 is sent in the direction of arrow C by the paper feed 6, color water-soluble-dye ink is breathed out to the part to which the ink composition adhered from the nozzle faces 10, 11, and 12 of the recording head 1, and a picture is recorded on it.
[0045]The above devices used with the record method of this invention can be used also for the record method by the conventional ink jet printing which only breathes out color water-soluble-dye ink from the nozzle faces 10, 11, and 12 of the recording head 1, and records a picture without using an ink composition. Therefore, the record method of this invention and the conventional record method can be used together, and a picture can be recorded in one documents.
[0046]
[Example]This invention is not limited by these examples although the example of preparation and an example explain this invention concretely.
[0047](Examples 1-5 of preparation) The ink composition (samples 1-5) which uses silica paints and/or alumina paints as the main ingredients using the material shown below was prepared.
[0048]
(Sample 1)
- Inorganic oxide paints silica particles (the diameter of grain of maximum size: 200

nm or less) mean particle diameter : -- about 100 -- nm 20 % of the weight . - High molecular compound ethylene glycol alkyl acetate - latex (as alkyl.) 10 % of the weight - methyl cellulose 5 % of the weight - water soluble organic solvent - isopropyl alcohol 10 % of the weight - glycerin 3 % of the weight and penetrating agent methyl -- calling -- ethyl -- 2 % of the weight of a subject's mixtures - water The remainder[0049]
(Sample 2)
- Inorganic oxide paints Silica-particles sol (they are content and solid content about NIPPON SHOKUBAI Make, trade name:Olga NOSHIRIKAZORU, and silica particles with a particle diameter of 20-40 nm)
20 % of the weight - high molecular compound Polyvinyl alcohol 15 % of the weight and water soluble organic solvent - polyethylene glycol 15 % of the weight - N-methyl-2-pyrrolidone 3 % of the weight - penetrating agent Pentanol 2 % of the weight - water Remainder[0050]
(Sample 3)
- Inorganic oxide paints Silica-particles sol (they are content and solid content about the Nissan Chemical Industries, Ltd. make, trade name:SU no textile, and silica particles with a particle diameter of 10-50 nm)
20 % of the weight - high molecular compound Polyvinyl alcohol 15 % of the weight - water soluble organic solvent - polyethylene glycol 15 % of the weight - N-methyl-2-pyrrolidone 3 % of the weight - penetrating agent Butyl-cellosolve pentanol 2 % of the weight - water Remainder[0051]
(Sample 4)
- Inorganic oxide paints (particle alumina, the diameter of grain of maximum size: 200 nm or less) Average particle Path: It is 20 % of the weight about 100 nm. - high molecular compound - casein 15 % of the weight 10 % of the weight of - polyvinyl pyrrolidones - water soluble organic solvent 1,3-propanediol 3 % of the weight - penetrating agent Butylcarbitol 2 % of the weight - water Remainder[0052]
(Sample 5)
- Inorganic oxide paints - silica-particles sol (they are content and solid content about the Nissan Chemical Industries, Ltd. make, Trade name: snow textile, and silica particles with a particle diameter of 10-50 nm)
15 % of the weight and particle alumina (the diameter of grain of maximum size: 200 nm or less) average grain ****: -- about 100 -- nm 5 % of the weight . - High molecular compound - carboxycellulose 10 % of the weight - polyvinyl alcohol 5 % of the weight - water soluble organic solvent - diethylene glycol 10 % of the weight - 1,3-propanediol 3 % of the weight - penetrating agent Butylcarbitol 2 % of the weight - water Remainder[0053](Examples 1-5) With the record method by the ink jet printing of this invention. It records on a regular paper, using respectively the ink composition (samples 1-5) obtained in the examples 1-5 of preparation, Using the water-soluble-dye ink composition of three colors (a yellow ink composition, a magenta ink composition, and a cyan ink composition) shown in Table 1, it recorded with the ink composition, and also the color evaluation picture was recorded continuously.
[0054]In order to have been based on ink jet printing, the recorder which has an on-demand type ink jet recording head (the regurgitation orifice diameter of 80 micrometers, the piezo vibrator driver voltage 60V, frequency of 4 kHz) which carries out the regurgitation of the ink by the piezo vibrator shown by drawing 1 and drawing 2 was used.
[0055]

[Table 1]

カラー水溶性染料インク	構成成分	配合比
イエローインク組成物	C．I．アシッドイエロー２３	2
	ジエチレングリコール	２５
	トリメチロールプロパン	3
	水	７０
マゼンタインク組成物	C．I．アシッドレッド５２	2
	ジエチレングリコール	２５
	ペンタンジオール	3
	水	７０
シアンインク組成物	C．I．ダイレクトブルー１９９	2
	ジエチレングリコール	２５
	γ－ブチロラクトン	3
	水	７０

[0056]About each acquired color evaluation picture, the recording characteristic was evaluated based on the following standard.
** Dot concentration : the print dot was measured using the spectrum colorimetry densimeter (X light company make, X light 938), and the relative value estimated on the basis of the measured value of the dot concentration by a conventional method.
** Dot shape : the print dot was observed with the stereoscopic microscope and the thing of ** and an infinite form was evaluated for that in which O and a round shape collapsed the almost circular thing somewhat as x.
[0057]** The degree of blot : the diameter of the print dot was measured under the microscope and the relative value estimated on the basis of the value of the orifice of an ink jet head.
** Bleeding between ink : in order of cyanogen, magenta, and yellow, it recorded repeatedly at lapped part 100 micrometers in width, and ** and except [its] were evaluated for that by which O and bleeding are observed a little in that by which the bleeding of ink is hardly observed as x.
** Image quality clear nature : 20 evaluators evaluated by viewing in ten steps (the highest rank 10, the minimum rank 1), and evaluated by the average value. The obtained result is shown in Table 2.
[0058]
[Table 2]

評価項目		サンプル 1	サンプル 2	サンプル 3	サンプル 4	サンプル 5	比較例１
ドット濃度	イエロー	１．２１	１．２８	１．２７	１．２５	１．２５	１．０
	マゼンタ	１．２３	１．３１	１．３２	１．１８	１．２６	１．０
	シアン	１．２４	１．２９	１．２９	１．２３	１．２６	１．０
ドット形状	イエロー	○	○	○	○	○	△
	マゼンタ	○	○	○	○	○	△
	シアン	○	○	○	○	○	△
滲み度	イエロー	２．６	２．０	２．０	２．７	２．３	３．４
	マゼンタ	２．８	２．２	２．３	２．６	２．４	３．６
	シアン	２．６	２．２	２．１	２．７	２．４	３．４
ブリード		○	○	○	○	○	×
画質鮮明性		６．６	８．０	７．８	６．７	７．７	２．５

[0059](Comparative example 1) Except not using an ink composition, like Examples 1-5, the color evaluation picture was recorded using the water-soluble-dye ink composition of three colors, and the recording characteristic was evaluated. The obtained result is shown in Table 2.
[0060]
[Effect of the Invention]The record method by the ink jet printing of this invention, It is a record method by the ink jet printing which records a picture in water-soluble-dye ink on a recorded material, the translucent white ink constituent which uses inorganic

oxide paints as the main ingredients to the part on the recorded material which records the picture of water-soluble-dye ink -- beforehand -- adherence **** -- it being characterized by including the ink jet printing characterized by things, and, The ink composition of this invention is used with the record method by the aforementioned ink jet printing, and the vehicle which consists of the high molecular compound and the water soluble organic solvent, and water as inorganic oxide paints, a dispersing agent, and/or a binder is included.

[0061]Therefore, when using and recording water-soluble-dye ink on non-coated paper, such as a regular paper and a postcard, the quality picture excellent in a water resisting property, robustness, and glossiness without a blot of a picture or back projection can be recorded uniform. Since the double-sided recording made this sets to be based on ink jet printing, and difficult with a regular paper becomes possible, the application and flexibility of printed matter production in record by ink jet printing spread, and it is economically advantageous.

[Translation done.]